THICKNESS OF BITUMINOUS-COAL AND LIGNITE SEAMS AT ALL MINES AND THICKNESS OF OVERBURDEN AT STRIP MINES IN THE UNITED STATES IN 1950

BY W. H. YOUNG AND R. L. ANDERSON

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INTRODUCTION

Many physical conditions affect productivity in bituminous-coal mining, such as thickness and character of the coal seam, dip or pitch of the seam, depth of cover, character of roof and overlying strata, mine water, etc. Of these, the thickness of the coal seam is probably the most-important single item that determines whether the output per man per day shall be low or high; however, in strip mining the depth of cover or overburden to be moved is of equal importance.

Bituminous coal is mined today from seams of exceedingly variable thickness - less than 2 feet to more than 50 feet; however, a large majority of the mines are producing coal from seams 3 to 6 feet thick. The average thickness of the coal seams mined in the United States has not changed materially in the past 30 years. The average seam thickness for all bituminous-coal mines was 63 inches in 1920, [3/] 65 inches in 1945, and 63 inches in 1950. As thick seams have been exhausted in the older fields, other thick seams have been opened in the newer fields.

Productivity increased from 4 net tons per man per day in 1920 to 6.77 in 1950. This 69-percent increase in productivity resulted from increased mechanization. The percentage of underground production represented by coal cut by machines increased from 61 in 1920 to 93 in 1950. Mechanical loading increased from less than 1 percent of underground production in 1920 to 69 percent in 1950, and strip mining increased from less than 2 percent to 24 percent of the total production during the same period.

The 1950 data included in the following tables were compiled from annual reports of production and mine operation submitted by bituminous-coal and lignite producers to the Bureau of Mines. Estimates were made for seam thickness not specified by the producer. Data for 1920 were compiled from the Report of the United States Coal Commission, part 3, table 11, facing page 1890.

[3/] Hotchkiss, W. E., Tryon, F. G., Warner, C. K., Plein, L. N., Dake, W. M., Anderson, R. L., Gallagher, J. J., and Schoenfeld, M. H., Mechanization, Employment, and Output Per Man in Bituminous-Coal Mining: W.P.A., National Research Project, vol. I, 1939, p. 62.

A survey of bituminous-coal mines for 1920 showed that 25 percent of the total United States production came from seams less than 4 feet thick, 45 percent from seams 4 to 6 feet thick, 25 percent from seams 6 to 8 feet thick, and 5 percent from seams thicker than 8 feet. A similar survey for 1950 showed 34 percent of output from seams under 4 feet thick, 36 percent from seams 4 to 6 feet thick, 22 percent from seams 6 to 8 feet thick, and 8 percent from seams over 8 feet thick. Table 1 shows the number and production of bituminous-coal and lignite mines classified by 1-foot intervals of seam thickness mined in 1920, 1945, and 1950.

Tables 2 and 3 contain 1950 data on productivity and average thickness of seams mined. The correlation between thickness of seam and productivity was not universal; instead, in a number of States and districts great productivity was achieved in thin seams. Conversely, several States and districts had low productivity in thick seams. Tables 4 to 10 give data on mines and production, classified by thickness of seam.

The coal seam of moderate thickness presents the least mining difficulties. Any decided thinning limits production, decreases recovery, and, therefore, increases cost. Thickening of the seam in underground mining has the same effect; for, as the seam increases in thickness, it becomes necessary to maintain larger pillars, timbering becomes more difficult and finally impracticable, and roof control is almost impossible. The limited information available indicates that, for maximum recovery in underground bituminous-coal mines, the ideal seam thickness lies between 6 and 8 feet.

Fig. 1 shows the percentage of bituminous coal produced, by thickness of seam mined, in the 10 largest coal-producing States and total United States in 1950. The States are arranged in order of the percentage of output mined from seams less than 4 feet thick. Fig. 2 shows the percentage of bituminous coal and lignite produced, by thickness of seam mined, in each State at strip mines in 1950, and fig. 3 shows similar data for underground mines.

Coal near the surface in relatively thin seams that are not suited to underground mining frequently can be recovered by stripping. In some areas, coal seams that could not be deep-mined profitably are being stripped successfully. In 1950 strip mining was carried on in 11 States in coal seams having an average thickness less than that in the deep mines in the same States. These 11 States produced 70 percent of the total strip output in 1950.

As previously mentioned, the depth of cover or overburden to be moved is equally as significant as the thickness of the coal in strip mining. Table 11 gives details on overburden excavated at strip mines in 1946 and 1950. The average thickness of overburden increased from 31.6 feet in 1946 to 39.0 feet in 1950. The ratio of thickness of overburden to thickness of coal seam is a very important factor in stripping operations. In 1950 the average thickness of overburden handled was eight times the average thickness of the coal mined.

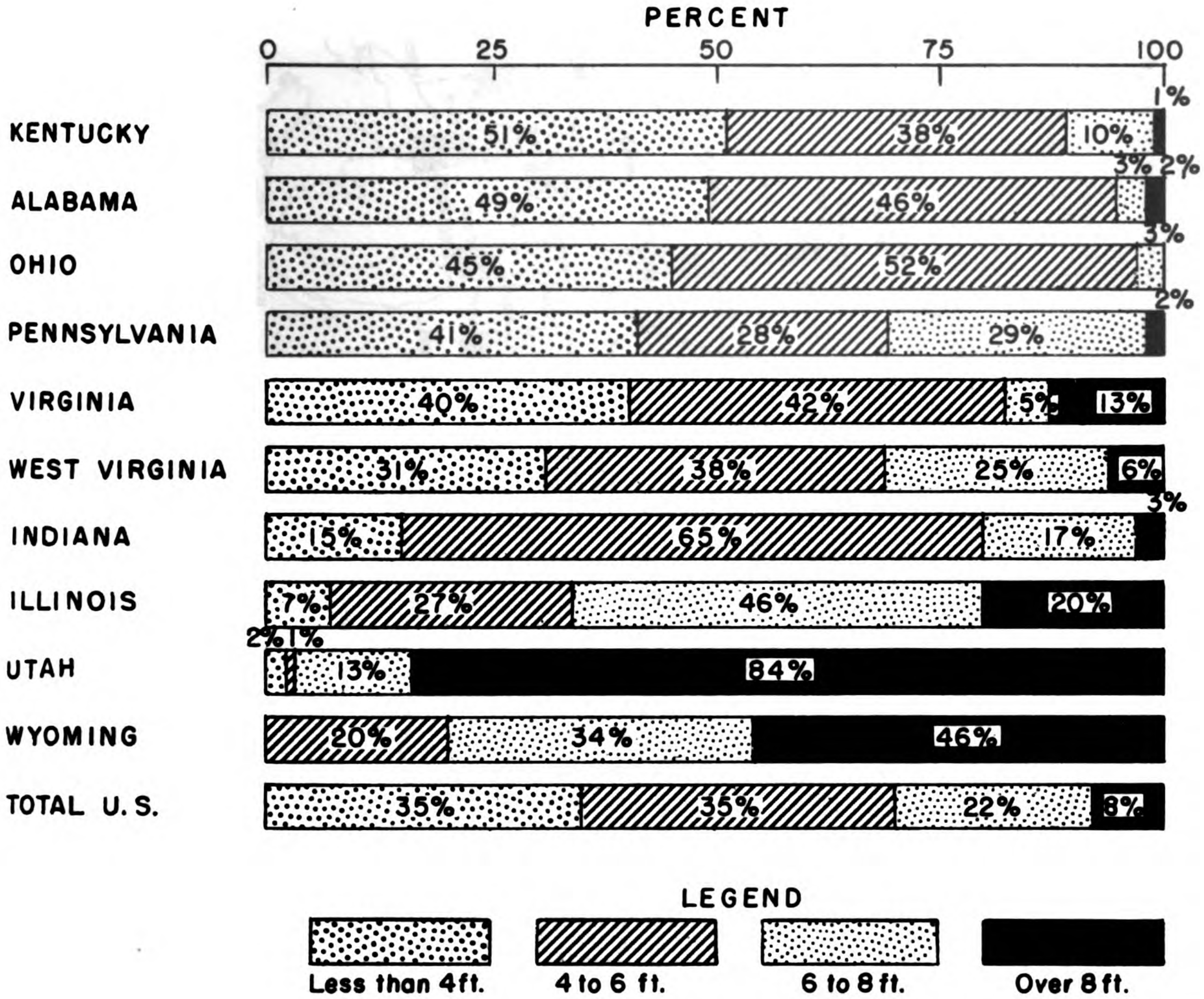

Figure 1. - Percentage of bituminous coal and lignite produced in the 10 largest coal-producing States and total United States, by thickness of seams mined in 1950.

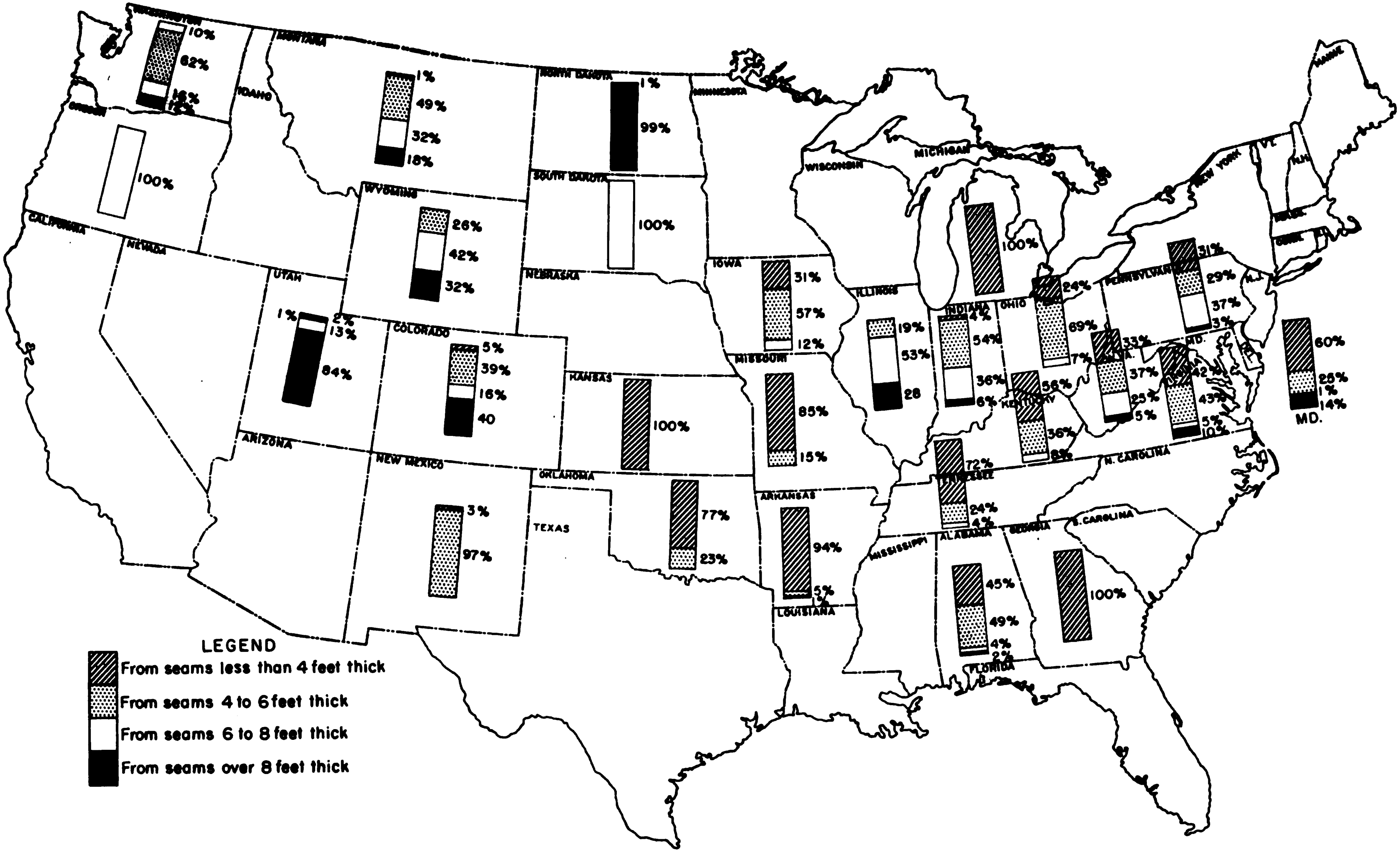

Figure 3. - Percentage of bituminous coal and lignite produced by thickness of seams mined in each State at underground mines in 1950.

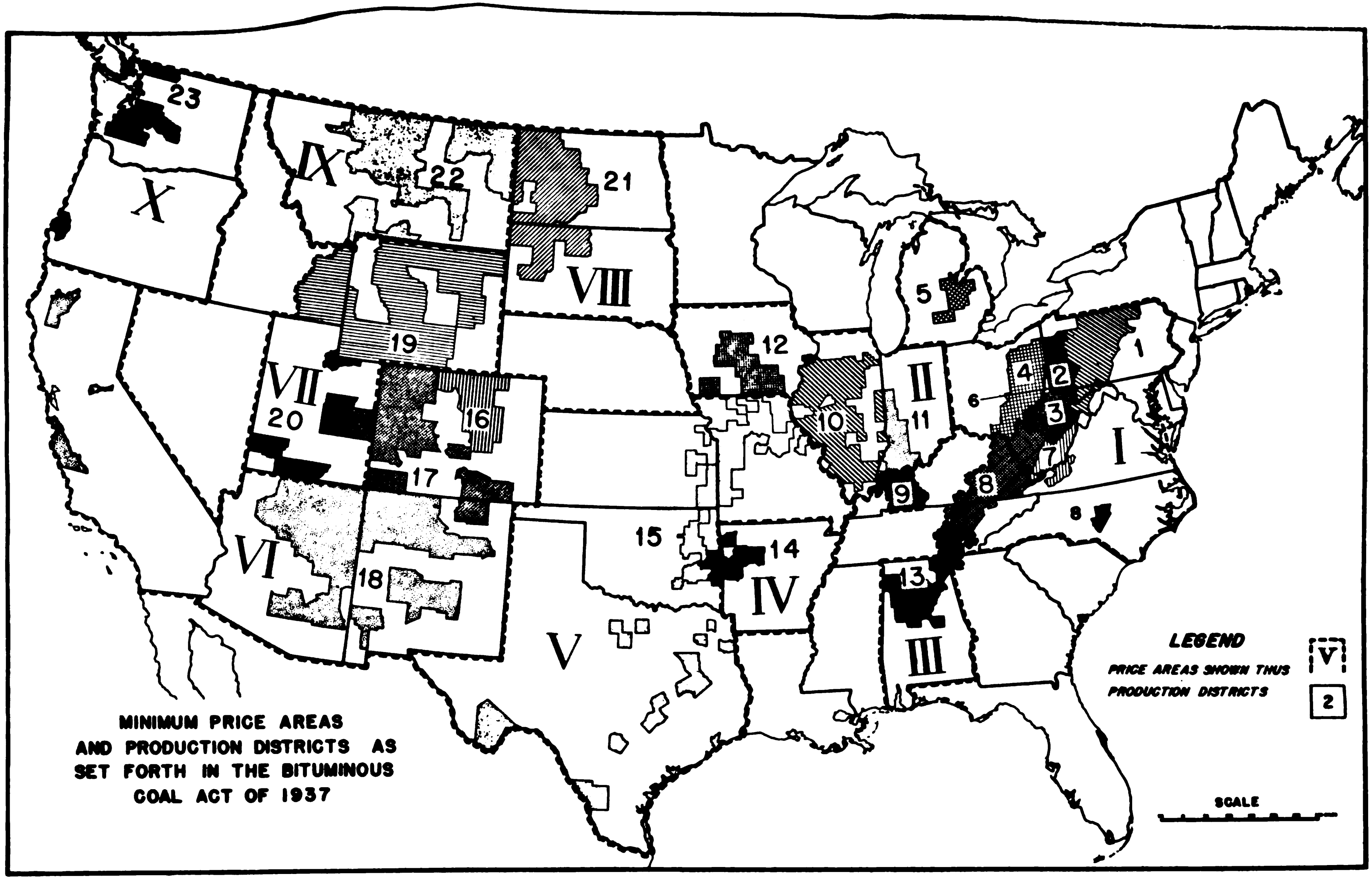

Figure 4. - Minimum price areas and production districts as set forth in the Bituminous Coal Act of 1937.

TABLE 1. - NUMBER AND PRODUCTION OF BITUMINOUS-COAL AND LIGNITE MINES IN THE UNITED STATES, CLASSIFIED BY THICKNESS OF SEAMS MINED IN 1920, 1945 AND 1950

(Exclusive of mines producing less than 1,000 tons)

Thickness of seams mined	1920				1945				1950			
	Mines		Production		Mines		Production		Mines		Production	
	Number	Percent	Thousands of net tons	Percent	Number	Percent	Thousands of net tons	Percent	Number	Percent	Thousands of net tons	Percent
Less than 2 feet...........	139	1.6	2,481	0.4	126	1.8	6,869	1.2	138	1.5	3,877	0.8
2 to 3 feet................	1,159	13.0	31,353	5.6	936	13.3	32,984	5.7	1,291	13.7	35,659	6.9
3 to 4 feet................	2,240	25.2	104,356	18.5	2,250	32.0	138,781	24.0	4,567	48.4	140,334	27.2
4 to 5 feet................	1,792	20.1	126,372	22.4	1,710	24.3	136,348	23.6	1,583	16.8	108,458	21.0
5 to 6 feet................	1,222	13.7	125,589	22.3	838	11.9	75,132	13.0	744	7.9	75,115	14.5
6 to 7 feet................	559	6.3	76,255	13.5	587	8.4	83,738	14.5	525	5.6	76,440	14.8
7 to 8 feet................	393	4.4	63,333	11.2	260	3.7	51,212	8.9	250	2.6	35,010	6.8
8 feet and over............	242	2.7	27,852	5.0	326	4.6	52,553	9.1	331	3.5	41,418	8.0
Unspecified................	1,161	13.0	6,165	1.1	-	-	-	-	-	-	-	-
Total................	8,907	100.0	563,756	100.0	7,033	100.0	577,617	100.0	9,429	100.0	516,311	100.0

Original from THE OHIO STATE UNIVERSITY

TABLE 2. - NUMBER OF MINES, PRODUCTION, OUTPUT PER MAN PER DAY, AND AVERAGE THICKNESS OF SEAMS MINED, AT STRIP AND UNDERGROUND BITUMINOUS-COAL AND LIGNITE MINES IN THE UNITED STATES, BY STATES, IN 1950

(Exclusive of mines producing less than 1,000 tons)

State	Strip mines				Underground mines				Total all mines			
	Number of mines	Production (net tons)	Average tons per man per day	Average thickness coal mined (feet)	Number of mines	Production (net tons)	Average tons per man per day	Average thickness coal mined (feet)	Number of mines	Production (net tons)	Average tons per man per day	Average thickness coal mined (feet)
Alabama	46	1,888,038	9.64	3.3	332	12,533,772	3.98	4.1	378	14,421,810	4.34	4.0
Alaska	5	130,737	10.11	3.2	2	281,718	5.10	4.8	7	412,455	6.05	4.3
Arizona	-	-	-	-	1	4,446	2.18	5.5	1	4,446	2.18	5.5
Arkansas	15	504,946	10.79	5.7	38	664,122	3.14	2.5	53	1,169,068	4.53	3.9
California (lignite)	1	(1)	-	-	-	-	-	-	1	(1)	-	-
Colorado	8	406,713	15.08	8.3	165	3,851,787	5.13	7.4	173	4,258,500	5.48	7.5
Georgia	-	-	-	-	7	18,000	2.92	1.5	7	18,000	2.92	1.5
Illinois	81	17,612,423	18.70	5.0	217	38,678,498	8.00	7.1	298	56,290,921	9.75	6.4
Indiana	44	10,739,567	16.71	4.4	56	9,217,462	7.88	5.8	100	19,957,029	11.01	5.0
Iowa	37	1,190,511	11.67	4.9	84	700,900	3.28	4.4	121	1,891,411	5.99	4.7
Kansas	32	2,024,352	14.22	1.9	16	100,628	2.45	2.8	48	2,124,980	11.58	1.9
Kentucky	136	13,977,643	19.12	5.3	3,123	64,517,960	5.59	4.1	3,259	78,495,603	6.39	4.4
Maryland	22	161,054	9.08	4.7	83	486,869	3.71	4.4	105	647,923	4.35	4.5
Michigan	-	-	-	-	1	11,500	1.98	2.5	1	11,500	1.98	2.5
Missouri	43	2,635,424	15.04	3.3	44	327,657	2.56	3.2	87	2,963,081	9.78	3.2
Montana												
Bituminous	1	1,708,149	92.78	23.0	15	759,887	6.38	5.7	16	2,468,036	19.15	17.7
Lignite	1	(1)	-	-	6	(1)	-	-	7	52,130	7.35	16.6
Total Montana	2	1,717,179	88.65	22.9	21	802,987	6.89	6.3	23	2,520,166	18.53	17.6
New Mexico	-	-	-	-	25	726,958	5.32	5.3	25	726,958	5.32	5.3
North Carolina	-	-	-	-	1	(1)	-	-	1	(1)	-	-
North Dakota (lignite)	37	2,828,056	27.45	9.4	7	432,917	10.05	16.7	44	3,260,973	22.32	10.4
Ohio	303	22,775,193	17.04	3.8	385	14,985,898	6.35	4.7	688	37,761,091	10.21	4.2
Oklahoma	29	1,727,174	10.90	2.1	34	951,397	3.74	3.6	63	2,678,571	6.49	2.7
Oregon	-	-	-	-	1	1,384	1.44	7.5	1	1,384	1.44	7.5
Pennsylvania	726	26,426,597	12.49	3.7	1,206	79,443,524	5.07	5.3	1,932	105,870,121	5.95	4.9
South Dakota (lignite)	2	34,989	10.36	4.5	1	1,211	5.05	6.5	3	36,200	10.01	4.6
Tennessee	16	584,066	10.68	2.9	117	4,485,734	4.35	3.9	133	5,069,800	4.67	3.8
Texas (lignite)	1	18,169	4.62	12.0	-	-	-	-	1	18,169	4.62	12.0
Utah	-	-	-	-	67	6,669,896	7.30	11.5	67	6,669,896	7.30	11.5
Virginia	19	1,565,646	16.11	6.1	308	16,101,001	5.21	4.8	327	17,666,647	5.54	4.9
Washington	4	70,540	8.09	7.0	22	803,449	3.79	5.7	26	873,989	3.96	5.8
West Virginia	249	12,986,154	14.78	5.5	1,162	131,129,529	6.07	5.1	1,411	144,115,683	6.41	5.1
Wyoming	12	1,458,899	20.29	38.3	33	4,889,350	7.42	13.5	45	6,348,249	8.69	19.2
Other States	-	11,524	8.63	10.2	-	67,035	2.80	12.5	-	26,429	1.46	3.5
Total	1,870	123,466,564	15.66	5.1	7,559	392,844,489	5.75	5.4	9,429	516,311,053	6.77	5.3

1/ Included under "Other States" to avoid disclosure.

TABLE 3. - NUMBER OF MINES, PRODUCTION, OUTPUT PER MAN PER DAY, AND AVERAGE THICKNESS OF SEAMS MINED, AT STRIP AND UNDERGROUND BITUMINOUS-COAL AND LIGNITE MINES IN THE UNITED STATES, BY DISTRICTS, IN 1950

(Districts as defined in the Bituminous Coal Act of 1937 and modifications thereto.
Exclusive of mines producing less than 1,000 tons)

District	Strip mines				Underground mines				Total all mines			
	Number of mines	Production (net tons)	Average tons per man per day	Average thickness coal mined (feet)	Number of mines	Production (net tons)	Average tons per man per day	Average thickness coal mined (feet)	Number of mines	Production (net tons)	Average tons per man per day	Average thickness coal mined (feet)
1. Eastern Pennsylvania.......	432	16,189,528	11.72	3.2	850	30,649,423	4.68	3.8	1,282	46,838,951	5.91	3.6
2. Western Pennsylvania.......	324	10,555,654	13.84	4.4	453	49,543,641	5.31	6.2	777	60,099,295	5.95	5.9
3. Northern West Virginia.....	140	7,764,156	16.39	6.1	369	34,014,364	7.59	6.5	509	41,778,520	8.43	6.4
4. Ohio.....................	303	22,775,193	17.04	3.8	385	14,985,898	6.35	4.7	688	37,761,091	10.21	4.2
5. Michigan..................	-	-	-	-	1	11,500	1.98	2.5	1	11,500	1.98	2.5
6. Panhandle.................	12	758,773	14.15	4.2	19	3,395,368	6.28	4.7	31	4,154,141	6.99	4.6
7. Southern Numbered 1........	58	2,819,240	12.20	4.4	392	45,743,396	4.85	4.5	450	48,562,636	5.02	4.5
8. Southern Numbered 2........	134	5,962,668	12.79	5.5	3,633	119,666,367	5.64	4.3	3,767	125,629,035	5.79	4.4
9. West Kentucky.............	64	11,467,285	22.58	5.2	239	12,566,096	9.01	5.3	303	24,033,381	12.63	5.3
10. Illinois.................	81	17,612,423	18.70	5.0	217	38,678,498	8.00	7.1	298	56,290,921	9.75	6.4
11. Indiana..................	44	10,739,567	16.71	4.4	56	9,217,462	7.88	5.8	100	19,957,029	11.01	5.0
12. Iowa.....................	37	1,190,511	11.67	4.9	84	700,900	3.28	4.4	121	1,891,411	5.99	4.7
13. Southeastern.............	50	2,071,894	9.72	3.3	384	13,161,669	4.00	4.1	434	15,233,563	4.35	4.0
14. Arkansas-Oklahoma..........	28	1,118,168	11.74	3.7	57	970,222	3.22	2.9	85	2,088,390	5.26	3.3
15. Southwestern..............	92	5,791,897	13.42	2.6	75	1,073,582	3.22	3.3	167	6,865,479	8.98	2.7
16. Northern Colorado..........	4	65,008	11.12	16.9	23	971,411	7.22	8.4	27	1,036,419	7.39	8.9
17. Southern Colorado..........	4	341,705	16.18	6.7	151	3,461,600	4.85	6.7	155	3,803,305	5.18	6.7
18. New Mexico................	1	2,494	6.65	3.5	17	150,180	3.60	4.6	18	152,674	3.63	4.6
19. Wyoming..................	12	1,458,899	20.29	38.3	33	4,889,350	7.42	13.5	45	6,348,249	8.69	19.2
20. Utah.....................	-	-	-	-	67	6,669,896	7.30	11.5	67	6,669,896	7.30	11.5
21. North-South Dakota (lignite)	39	2,863,045	26.91	9.4	8	434,128	10.02	16.6	47	3,297,173	22.02	10.3
22. Montana..................	2	1,717,179	88.65	22.9	21	802,987	6.89	6.3	23	2,520,166	18.53	17.6
23. Washington...............	9	201,277	9.30	4.5	25	1,086,551	4.06	5.4	34	1,287,828	4.45	5.3
Total..................	1,870	123,466,564	15.66	5.1	7,559	392,844,489	5.75	5.4	9,429	516,311,053	6.77	5.3

TABLE 4. - NUMBER AND PRODUCTION OF BITUMINOUS-COAL AND LIGNITE UNDERGROUND MINES IN THE UNITED STATES, CLASSIFIED BY THICKNESS OF SEAMS MINED IN EACH STATE, IN 1950

(Exclusive of mines producing less than 1,000 tons)

State	Less than 2 feet			2 to 3 feet			3 to 4 feet			4 to 5 feet			5 to 6 feet			6 to 7 feet			7 to 8 feet			8 feet and over			Total	
	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)
Alabama	5	194,497	1.5	165	2,814,757	22.5	130	2,676,890	21.4	17	4,299,017	34.3	8	1,857,421	14.8	5	246,921	2.0	1	238,376	1.9	1	205,893	1.6	332	12,533,772
Alaska	—	—	—	1	(1)	—	—	—	—	—	—	—	—	—	—	1	(1)	—	—	—	—	—	—	—	2	281,718
Arizona	—	—	—	—	—	—	—	—	—	—	—	—	1	(1)	—	—	—	—	—	—	—	—	—	—	1	(1)
Arkansas	9	216,171	32.5	14	300,967	45.3	7	109,482	16.5	7	30,499	4.6	—	—	—	—	—	—	1	7,003	1.1	—	—	—	38	664,122
California (lignite)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Colorado	2	49,953	1.3	2	(1)	—	18	119,752	3.1	31	1,033,647	26.8	43	456,916	11.9	23	432,422	11.2	13	200,521	5.2	33	1,555,333	40.4	165	3,851,787
Georgia	7	18,000	100.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	18,000
Illinois	—	—	—	—	—	—	9	89,275	.2	75	4,644,373	12.0	35	2,724,308	7.0	51	11,740,466	30.4	28	8,490,047	22.0	19	10,990,029	28.4	217	38,678,498
Indiana	—	—	—	—	—	—	4	373,221	4.0	21	1,628,145	17.7	16	3,373,260	36.6	11	2,715,734	29.5	3	621,262	6.7	1	505,840	5.5	56	9,217,462
Iowa	1	8,971	1.3	20	161,403	23.0	6	45,647	6.5	39	232,413	33.2	11	168,047	24.0	6	80,222	11.4	1	4,197	.6	—	—	—	84	700,900
Kansas	6	21,014	20.9	5	29,279	29.1	5	50,335	50.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	100,628
Kentucky	2	3,728	(2)	334	4,634,263	7.2	2,386	31,819,315	49.3	331	15,624,794	24.2	39	7,436,699	11.5	21	4,501,428	7.0	7	404,654	.6	3	93,079	.2	3,123	64,517,960
Maryland	2	2,281	.5	33	159,222	32.7	19	132,918	27.3	18	75,124	15.4	2	48,469	9.9	—	—	—	1	2,756	.6	8	66,099	13.6	83	486,869
Michigan	—	—	—	1	11,500	100.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	11,500
Missouri	8	27,147	8.3	16	87,646	26.7	12	164,358	50.2	8	48,506	14.8	—	—	—	—	—	—	—	—	—	—	—	—	44	327,657
Montana: Bituminous	—	—	—	—	—	—	1	4,687	0.6	3	396,861	52.2	—	—	—	6	248,624	32.7	1	3,331	0.5	4	106,384	14.0	15	759,887
Lignite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	3,001	7.0	5	40,099	93.0	6	43,100
Total Montana	—	—	—	—	—	—	1	4,687	0.6	3	396,861	49.4	—	—	—	6	248,624	31.0	2	6,332	0.8	9	146,483	18.2	21	802,987
New Mexico	—	—	—	—	—	—	5	22,416	3.1	15	117,512	16.2	4	584,502	80.4	1	(1)	—	—	—	—	—	—	—	25	726,958
North Carolina	—	—	—	—	—	—	1	(1)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	(1)
North Dakota (lignite)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	6,221	1.4	5	426,696	98.6	7	432,917
Ohio	—	—	—	44	295,183	2.0	194	3,321,768	22.2	88	5,505,422	36.7	40	4,876,107	32.5	12	961,371	6.5	4	21,097	.1	3	4,950	(2)	385	14,985,898
Oklahoma	8	34,662	3.6	6	59,736	6.3	14	636,188	66.9	5	217,740	22.9	1	(1)	—	—	—	—	—	—	—	—	—	—	34	951,397
Oregon	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1,384	100.0	—	—	—	1	1,384
Pennsylvania	4	92,385	.1	129	2,205,969	2.8	482	22,486,011	28.3	248	8,159,206	10.3	159	14,889,460	18.7	114	21,288,768	26.8	49	7,603,993	9.6	21	2,717,732	3.4	1,206	79,443,524
South Dakota (lignite)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1,211	100.0	—	—	—	—	—	—	1	1,211
Tennessee	—	—	—	11	373,670	8.3	81	2,852,173	63.6	16	728,764	16.2	6	340,794	7.6	2	186,520	4.2	1	3,813	.1	—	—	—	117	4,485,734
Texas (lignite)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Utah	—	—	—	—	—	—	6	151,401	2.3	3	35,545	.5	2	9,065	.1	5	253,935	3.8	11	639,682	9.6	40	5,580,268	83.7	67	6,669,896
Virginia	—	—	—	8	426,562	2.6	246	6,272,693	39.0	31	4,214,590	26.2	13	2,637,837	16.4	6	885,495	5.5	—	—	—	4	1,663,824	10.3	308	16,101,001
Washington	1	8,954	1.1	3	68,690	8.6	1	(1)	—	3	41,204	5.1	4	453,983	56.5	3	126,351	15.7	1	6,245	.8	6	90,596	12.0	22	803,449
West Virginia	—	—	—	112	6,039,261	4.6	329	37,047,851	28.3	309	29,361,561	22.4	151	18,943,005	14.4	114	17,490,944	13.3	79	14,931,014	11.4	68	7,315,893	5.6	1,162	131,129,529
Wyoming	—	—	—	—	—	—	4	10,051	.2	4	1,075,740	22.0	7	183,161	3.7	4	1,753,772	35.9	2	315,933	6.5	12	1,550,693	31.7	33	4,889,350
Other States 1/	—	—	—	—	121,960	—	—	25,361	—	—	—	—	—	7,517	—	—	165,529	—	—	—	—	—	—	—	—	28,381
Total	55	677,763	0.2	904	17,790,068	4.5	3,960	108,411,793	27.6	1,272	77,470,663	19.7	542	58,990,551	15.0	386	63,079,713	16.1	207	33,504,530	8.5	233	32,919,408	8.4	7,559	392,844,489

1/Included under "Other States" to avoid disclosure.
2/Less than 0.05 percent.

TABLE 5. - NUMBER AND PRODUCTION OF BITUMINOUS-COAL AND LIGNITE STRIP MINES IN THE UNITED STATES, CLASSIFIED BY THICKNESS OF SEAMS MINED IN EACH STATE, IN 1950

(Exclusive of mines producing less than 1,000 tons)

State	Less than 2 feet			2 to 3 feet			3 to 4 feet			4 to 5 feet			5 to 6 feet			6 to 7 feet			7 to 8 feet			8 feet and over			Total	
	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)
Alabama....................	5	33,473	1.8	29	1,023,374	54.2	7	327,443	17.3	2	361,532	19.1	1	98,124	5.2	1	16,700	0.9	-	-	-	1	27,392	1.5	46	1,888,038
Alaska.....................	-	-	-	4	(1)	-	1	(1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	130,737
Arizona....................	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arkansas...................	7	96,971	19.2	1	2,000	.4	4	136,613	27.0	1	11,400	2.3	-	-	-	1	5,154	1.0	-	-	-	1	(1)	-	15	504,946
California (lignite)......	-	-	-	-	-	-	1	(1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	(1)
Colorado...................	-	-	-	-	-	-	1	17,446	4.3	-	-	-	1	146,057	35.9	3	48,449	11.9	-	-	-	3	194,761	47.9	8	406,713
Georgia....................	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Illinois...................	-	-	-	8	101,414	.6	15	4,026,576	22.9	27	5,858,021	33.3	11	1,759,990	10.0	14	5,752,262	32.6	4	56,944	0.3	2	57,216	.3	81	17,612,423
Indiana....................	1	21,582	.2	7	565,050	5.3	10	2,006,941	18.7	19	6,578,199	61.2	5	1,462,361	13.6	1	103,588	1.0	1	1,846	(2)	-	-	-	44	10,739,567
Iowa.......................	-	-	-	2	46,347	3.9	10	180,941	15.2	16	535,473	45.0	6	104,839	8.8	3	322,911	27.1	-	-	-	-	-	-	37	1,190,511
Kansas.....................	25	1,301,709	64.3	1	685,375	33.9	6	37,268	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	2,024,352
Kentucky...................	1	16,561	.1	13	257,577	1.9	77	3,095,696	22.1	23	2,488,565	17.8	11	4,508,600	32.3	10	2,993,525	21.4	-	-	-	1	617,119	4.4	136	13,977,643
Maryland...................	-	-	-	3	42,625	26.5	5	46,363	28.8	5	26,955	16.7	-	-	-	-	-	-	-	-	-	9	45,111	28.0	22	161,054
Michigan...................	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Missouri...................	8	163,110	6.2	16	778,464	29.5	13	1,252,293	47.5	5	439,274	16.7	-	-	-	1	2,283	.1	-	-	-	-	-	-	43	2,635,424
Montana:																										
Bituminous............	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1,708,149	100.0	1	1,708,149
Lignite...............	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	(1)	-	1	(1)
Total Montana.........	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1,717,179	100.0	2	1,717,179
New Mexico.................	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North Carolina.............	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North Dakota (lignite)....	-	-	-	-	-	-	-	-	-	1	11,029	0.4	4	13,724	0.5	4	411,366	14.5	5	403,429	14.3	23	1,988,508	70.3	37	2,828,056
Ohio.......................	8	165,931	0.7	73	4,048,198	17.8	160	9,058,644	39.8	45	7,956,784	34.9	14	1,501,137	6.6	1	26,800	.1	1	8,020	(2)	1	9,679	.1	303	22,775,193
Oklahoma...................	10	814,016	47.1	15	814,668	47.2	2	20,757	1.2	2	77,733	4.5	-	-	-	-	-	-	-	-	-	-	-	-	29	1,727,174
Oregon.....................	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pennsylvania...............	16	396,615	1.5	201	8,946,482	33.8	229	8,984,613	34.0	107	4,064,123	15.4	81	2,433,368	9.2	61	1,145,462	4.3	22	305,565	1.2	9	150,369	.6	726	26,426,597
South Dakota (lignite)....	-	-	-	-	-	-	-	-	-	2	34,989	100.0	-	-	-	-	-	-	-	-	-	-	-	-	2	34,989
Tennessee..................	1	159,395	27.3	4	132,662	22.7	9	204,795	35.1	1	52,000	8.9	1	35,214	6.0	-	-	-	-	-	-	-	-	-	16	584,066
Texas (lignite)............	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	18,169	100.0	1	18,169
Utah.......................	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Virginia...................	-	-	-	2	143,539	9.2	3	248,363	15.9	5	290,130	18.5	3	224,245	14.3	3	87,373	5.6	-	-	-	3	571,996	36.5	19	1,565,646
Washington.................	-	-	-	1	(1)	-	-	-	-	1	37,819	53.6	-	-	-	-	-	-	-	-	-	2	30,227	42.9	4	70,540
West Virginia..............	1	29,479	.2	7	241,344	1.9	54	2,181,688	16.8	48	2,160,454	16.6	64	3,836,909	29.6	35	2,363,158	18.2	10	730,088	5.6	30	1,443,034	11.1	249	12,986,154
Wyoming....................	-	-	-	-	-	-	-	-	-	1	2,605	.2	-	-	-	1	81,005	5.5	-	-	-	10	1,375,289	94.3	12	1,458,899
Other States 1/............	-	-	-	-	39,916	-	-	95,809	-	-	-	-	-	-	-	-	-	-	-	-	-	-	261,838	-	-	11,524
Total..............	83	3,198,842	2.6	387	17,869,035	14.5	607	31,922,249	25.8	311	30,987,085	25.1	202	16,124,568	13.1	139	13,360,036	10.8	43	1,505,892	1.2	98	8,498,857	6.9	1,870	123,466,564

1/ Included under "Other States" to avoid disclosure.
2/ Less than 0.05 percent.

TABLE 6. - NUMBER AND PRODUCTION OF ALL BITUMINOUS-COAL AND LIGNITE MINES IN THE UNITED STATES, CLASSIFIED BY THICKNESS OF SEAMS MINED IN EACH STATE, IN 1950

(Exclusive of mines producing less than 1,000 tons)

State	Less than 2 feet			2 to 3 feet			3 to 4 feet			4 to 5 feet			5 to 6 feet			6 to 7 feet			7 to 8 feet			8 feet and over			Total	
	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)	Percent of total production	Number of mines	Production (net tons)
Alabama	10	227,970	1.6	194	3,838,131	26.6	137	3,004,333	20.9	19	4,660,549	32.3	9	1,955,545	13.6	6	263,621	1.9	1	238,376	1.5	2	233,285	1.6	378	14,421,810
Alaska	-	-	-	5	156,139	37.9	1	(1)	-	-	-	-	-	-	-	1	(1)	-	-	-	-	-	-	-	7	412,455
Arizona	-	-	-	-	-	-	-	-	-	-	-	-	1	4,446	100.0	-	-	-	-	-	-	-	-	-	1	4,446
Arkansas	16	313,142	26.8	15	302,967	25.9	11	246,095	21.0	8	41,899	3.6	-	-	-	1	5,154	.5	1	7,003	.6	1	(1)	-	53	1,169,068
California (lignite)	-	-	-	-	-	-	1	(1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	(1)
Colorado	2	49,953	1.2	2	3,243	.1	19	137,198	3.2	31	1,033,647	24.3	44	602,973	14.1	26	480,871	11.3	13	200,521	4.7	36	1,750,094	41.1	173	4,258,500
Georgia	7	18,000	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	18,000
Illinois	-	-	-	8	101,414	.2	24	4,115,851	7.3	102	10,502,394	18.6	46	4,484,298	8.0	65	17,492,728	31.1	32	8,546,991	15.2	21	11,047,245	19.6	298	56,290,921
Indiana	1	21,582	.1	7	565,050	2.8	14	2,380,162	11.9	40	8,206,344	41.1	21	4,835,621	24.3	12	2,819,322	14.1	4	623,108	3.1	1	505,840	2.6	100	19,957,029
Iowa	1	8,971	.5	22	207,750	11.0	16	226,588	12.0	55	767,886	40.6	17	272,886	14.4	9	403,133	21.3	1	4,197	.2	-	-	-	121	1,891,411
Kansas	31	1,322,723	62.3	6	714,654	33.6	11	87,603	4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48	2,124,980
Kentucky	3	20,289	(2)	347	4,891,840	6.2	2,463	34,915,011	44.5	354	18,113,359	23.1	50	11,945,299	15.2	31	7,494,953	9.6	7	404,654	.5	4	710,198	.9	3,259	78,495,603
Maryland	2	2,281	.3	36	201,847	31.1	24	179,281	27.7	23	102,079	15.8	2	48,469	7.5	-	-	-	1	2,756	.4	17	111,210	17.2	105	647,923
Michigan	-	-	-	1	11,500	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	11,500
Missouri	16	190,257	6.4	32	866,110	29.2	25	1,416,651	47.8	13	487,780	16.5	-	-	-	1	2,283	.1	-	-	-	-	-	-	87	2,963,081
Montana:																										
Bituminous	-	-	-	-	-	-	1	4,687	0.2	3	396,861	16.1	-	-	-	6	248,624	10.1	1	3,331	0.1	5	1,814,533	73.5	16	2,468,036
Lignite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3,001	5.8	6	(1)	-	7	52,130
Total Montana	-	-	-	-	-	-	1	4,687	0.2	3	396,861	15.7	-	-	-	6	248,624	9.9	2	6,332	0.3	11	1,863,662	73.9	23	2,520,166
New Mexico	-	-	-	-	-	-	5	22,416	3.1	15	117,512	16.2	4	584,502	80.4	1	2,528	.3	-	-	-	-	-	-	25	726,958
North Carolina	-	-	-	-	-	-	1	(1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	(1)
North Dakota (lignite)	-	-	-	-	-	-	-	-	-	1	11,029	.3	4	13,724	.4	4	411,366	12.6	7	409,650	12.6	28	2,415,204	74.1	44	3,260,973
Ohio	8	165,931	0.4	117	4,343,381	11.5	354	12,380,412	32.8	133	13,462,206	35.7	54	6,377,244	16.9	13	988,171	2.6	5	29,117	.1	4	14,629	(2)	688	37,761,091
Oklahoma	18	848,678	31.7	21	874,404	32.7	16	656,945	24.5	7	295,473	11.0	1	3,071	.1	-	-	-	-	-	-	-	-	-	63	2,678,571
Oregon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1,384	100.0	-	-	-	1	1,384
Pennsylvania	20	489,000	.5	330	11,152,451	10.5	711	31,470,624	29.7	355	12,223,329	11.5	240	17,322,828	16.4	175	22,434,230	21.2	71	7,909,558	7.5	30	2,868,101	2.7	1,932	105,870,121
South Dakota (lignite)	-	-	-	-	-	-	-	-	-	2	34,989	96.7	-	-	-	1	(1)	-	-	-	-	-	-	-	3	36,200
Tennessee	1	159,395	3.1	15	506,332	10.0	90	3,056,968	60.3	17	780,764	15.4	7	376,008	7.4	2	186,520	3.7	1	303,813	.1	-	-	-	133	5,069,800
Texas (lignite)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	18,169	100.0	1	18,169
Utah	-	-	-	-	-	-	6	151,401	2.3	3	35,545	.5	2	9,065	.1	5	253,935	3.8	11	639,682	9.6	40	5,580,268	83.7	67	6,669,896
Virginia	-	-	-	10	570,101	3.2	249	6,521,056	36.9	36	4,504,720	25.5	16	2,862,082	16.2	9	972,868	5.5	-	-	-	7	2,235,820	12.7	327	17,666,647
Washington	1	8,954	1.0	4	71,184	8.2	1	1,426	.2	4	79,023	9.0	4	453,983	51.9	3	126,351	14.5	1	6,245	.7	8	126,823	14.5	26	873,989
West Virginia	1	29,479	(2)	119	6,280,605	4.3	383	39,229,539	27.2	357	31,522,015	21.9	215	22,779,914	15.8	149	19,854,102	13.8	89	15,661,102	10.9	98	8,758,927	6.1	1,411	144,115,683
Wyoming	-	-	-	-	-	-	4	10,051	.1	5	1,078,345	17.0	7	183,161	2.9	5	1,834,777	28.9	2	315,933	5.0	22	2,925,982	46.1	45	6,348,249
Other States 1/	-	-	-	-	-	-	-	119,744	-	-	-	-	-	-	-	-	164,212	-	-	-	-	-	301,937	-	-	26,429
Total	138	3,876,605	0.8	1,291	35,659,103	6.9	4,567	140,334,042	27.2	1,583	108,457,748	21.0	744	75,115,119	14.5	525	76,439,749	14.8	250	35,010,422	6.8	331	41,418,265	8.0	9,429	516,311,053

1/ Included under "Other States" to avoid disclosure.
2/ Less than 0.05 percent.

TABLE 11. - OVERBURDEN AT BITUMINOUS-COAL AND LIGNITE STRIP MINES IN THE UNITED STATES, 1946 AND 1950

State	Number of strip mines		Mined by stripping (net tons)		Overburden excavated				Coal seam mined-average thickness (feet)	
					Cubic yards per net ton of coal mined		Average thickness (feet)			
	1946	1950	1946	1950	1946	1950	1946	1950	1946	1950
Alabama	43	46	1,815,146	1,888,038	8.5	9.0	24.7	25.0	3.9	3.3
Alaska	2	5	86,636	130,737	(1/)	(1/)	(1/)	60.7	(1/)	3.2
Arkansas	20	15	563,242	504,946	9.5	16.1	27.2	22.8	4.2	5.7
Colorado	4	8	155,023	406,713	4.4	6.7	40.0	27.0	10.0	8.3
Georgia	1	---	88,965	---	(1/)	---	(1/)	---	(1/)	---
Illinois	46	81	15,161,818	17,612,423	12.4	13.4	43.2	47.1	4.5	5.0
Indiana	50	44	11,826,355	10,739,567	10.1	11.5	37.2	40.0	4.2	4.4
Iowa	23	37	630,833	1,190,511	10.9	9.1	37.6	26.3	4.1	4.9
Kansas	30	32	2,282,721	2,024,352	23.4	19.4	33.6	30.7	1.6	1.9
Kentucky:										
Eastern	24	72	1,444,191	2,510,358	8.2	8.8	27.8	38.8	3.6	5.6
Western	32	64	5,910,173	11,467,285	5.3	5.3	28.8	38.2	5.9	5.2
Total Kentucky	56	136	7,354,364	13,977,643	5.5	5.3	28.7	38.2	5.4	5.3
Maryland	23	22	557,730	161,054	3.5	(1/)	28.7	27.4	8.3	4.7
Missouri	29	43	3,340,921	2,635,424	15.1	17.1	30.3	32.5	2.5	3.3
Montana:										
Bituminous	1	1	2,452,753	1,708,149	2.2	2.8	49.2	64.0	25.0	23.0
Lignite	1	1	1,079	9,030	36.1	(1/)	20.0	26.0	6.0	12.0
Total Montana	2	2	2,453,832	1,717,179	2.2	2.8	49.2	63.8	25.0	22.9
North Dakota (lignite)	28	37	2,127,576	2,828,056	5.2	5.6	47.5	38.2	10.3	9.4
Ohio	197	303	14,206,939	22,775,193	8.4	10.9	25.8	36.7	3.7	3.8
Oklahoma	22	29	1,672,494	1,727,174	14.9	19.3	29.0	31.7	2.0	2.1
Pennsylvania	640	726	31,686,807	26,426,597	8.7	9.6	25.3	33.3	4.1	3.7
Tennessee	7	16	196,207	584,066	10.4	16.1	21.4	27.1	2.4	2.9
Texas (lignite)	1	1	55,978	18,169	2.8	3.1	30.0	25.0	12.0	12.0
Virginia	15	19	655,816	1,565,646	4.8	6.3	28.2	50.1	7.8	6.1
Washington	8	4	97,556	70,540	6.9	2.8	23.3	23.6	7.1	7.0
West Virginia	186	249	14,937,127	12,986,154	6.4	6.5	30.9	38.5	6.1	5.5
Wyoming	9	12	992,685	1,458,899	2.1	2.1	46.3	38.2	28.1	38.3
Other States:										
California and South Dakota (lignite)	3	3	16,946	37,483	8.5	10.8	33.1	33.4	4.4	4.4
Total	1,445	1,870	112,963,717	123,466,564	9.1	10.7	31.6	39.0	5.2	5.1

1/Data not available.

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DESCRIPTION OF DISTRICTS

(As defined in the Bituminous Coal Act of 1937)

District 1. Eastern Pennsylvania

The following counties in Pennsylvania: Bedford, Blair, Bradford, Cambria, Cameron, Centre, Clarion, Clearfield, Clinton, Elk, Forest, Fulton, Huntingdon, Jefferson, Lycoming, McKean, Mifflin, Potter, Somerset, Tioga.

Armstrong County, including mines served by the P. & S. R.R. on the west bank of the Allegheny River, and north of the Conemaugh division of the Pennsylvania Railroad.

Fayette County, all mines on and east of the line of Indian Creek Valley branch of the Baltimore & Ohio Railroad.

Indiana County, north of but excluding the Saltsburg branch of the Pennsylvania Railroad between Edri and Blairsville, both exclusive.

Westmoreland County, including all mines served by the Pennsylvania Railroad, Torrance, and east.

All coal-producing counties in the State of Maryland.

The following counties in West Virginia: Grant, Mineral, and Tucker.

District 2. Western Pennsylvania

The following counties in Pennsylvania: Allegheny, Beaver, Butler, Greene, Lawrence, Mercer, Venango, Washington.

Armstrong County, west of the Allegheny River and exclusive of mines served by the P. & S. R.R.

Indiana County, including all mines served on the Saltsburg branch of the Pennsylvania Railroad north of Conemaugh River.

Fayette County, except all mines on and east of the line of Indian Creek Valley branch of the Baltimore & Ohio Railroad.

Westmoreland County, including all mines except those served by the Pennsylvania Railroad from Torrance, east.

District 3. Northern West Virginia

The following counties in West Virginia: Barbour, Braxton, Calhoun, Doddridge, Gilmer, Harrison, Jackson, Lewis, Marion, Monongalia, Pleasants, Preston, Randolph, Ritchie, Roane, Taylor, Tyler, Upshur, Webster, Wetzel, Wirt, Wood.

That part of Nicholas County including mines served by the Baltimore & Ohio Railroad and north.

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District 4. Ohio

All coal-producing counties in Ohio.

District 5. Michigan

All coal-producing counties in Michigan.

District 6. Panhandle

The following counties in West Virginia: Brooke, Hancock, Marshall, and Ohio.

District 7. Southern No. 1

The following counties in West Virginia: Greenbrier, Mercer, Monroe, Pocahontas, Summers.

Fayette County, east of Gauley River and including the Gauley River branch of the Chesapeake & Ohio Railroad and mines served by the Virginian Railway.

McDowell County, that portion served by the Dry Fork branch of the Norfolk & Western Railroad and east thereof.

Raleigh County, excluding all mines on the Coal River branch of the Chesepeake & Ohio Railroad.

Wyoming County, that portion served by the Gilbert branch of the Virginian Railway lying east of the mouth of Skin Fork of Guyandot River and that portion served by the main line and the Glen Rogers branch of the Virginian Railway.

The following counties in Virginia: Montgomery, Pulaski, Wythe, Giles, Craig.

Tazewell County, that portion served by the Dry Fork branch to Cedar Bluff and from Bluestone Junction to Boissevain branch of the Norfolk & Western Railroad and Richlands-Jewell Ridge branch of the Norfolk & Western Railroad.

Buchanan County, that portion served by the Richlands-Jewell Ridge branch of the Norfolk & Western Railroad and that portion of said county on the headwaters of Dismal Creek, east of Lynn Camp Creek (a tributary of Dismal Creek).

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District 8. Southern No. 2

The following counties in West Virginia: Boone, Clay, Kanawha, Lincoln, Logan, Mason, Mingo, Putnam, Wayne, Cabell.

Fayette County, west of but not including mines of the Gauley River branch of the Chesapeake & Ohio Railroad.

McDowell County, that portion not served by and lying west of the Dry Fork branch of the Norfolk & Western Railroad.

Raleigh County, all mines on the Coal River branch of the Chesapeake & Ohio Railroad and north thereof.

Nicholas County, that part south of and not served by the Baltimore & Ohio Railroad.

Wyoming County, that portion served by Gilbert branch of the Virginian Railway lying west of the mouth of Skin Fork of Guyandot River.

The following counties in Virginia: Dickinson, Lee, Russell, Scott, Wise.

All of Buchanan County, except that portion of the headwaters of Dismal Creek east of Lynn Camp Creek (a tributary of Dismal Creek) and that portion served by the Richlands-Jewell Ridge branch of the Norfolk & Western Railroad.

Tazewell County, except portions served by the Dry Fork branch of Norfolk & Western Railroad and branch from Bluestone Junction to Boissevain of Norfolk & Western Railroad and Richlands-Jewell Ridge branch of the Norfolk & Western Railroad.

The following counties in Kentucky: Bell, Boyd, Breathitt, Carter, Clay, Elliott, Floyd, Greenup, Harlan, Jackson, Johnson, Knott, Knox, Laurel, Lawrence, Lee, Leslie, Letcher, McCreary, Magoffin, Martin, Morgan, Owsley, Perry, Pike, Rockcastle, Wayne, Whitley.

The following counties in Tennessee: Anderson, Campbell, Claiborne, Cumberland, Fentress, Morgan, Overton, Roane, Scott.

The following counties in North Carolina: Lee, Chatham, Moore.

District 9. West Kentucky

The following counties in Kentucky: Butler, Christian, Crittenden, Daviess, Hancock, Henderson, Hopkins, Logan, McLean, Muhlenberg, Ohio, Simpson, Todd, Union, Warren, Webster.

District 10. Illinois

All coal-producing counties in Illinois.

District 11. Indiana

All coal-producing counties in Indiana.

District 12. Iowa

All coal-producing counties in Iowa.

District 13. Southeastern

All coal-producing counties in Alabama.

The following counties in Georgia: Dade, Walker.

The following counties in Tennessee: Marion, Grundy, Hamilton, Bledsoe, Sequatchie, White, Van Buren, Warren, McMinn, Rhea.

District 14. Arkansas-Oklahoma

The following counties in Arkansas: All counties in the State.

The following counties in Oklahoma: Haskell, LeFlore, Sequoyah.

District 15. Southwestern

All coal-producing counties in Kansas. All coal-producing counties in Texas. All coal-producing counties in Missouri.

The following counties in Oklahoma: Coal, Craig, Latimer, Muskogee, Okmulgee, Pittsburg, Rogers, Tulsa, Wagoner.

District 16. Northern Colorado

The following counties in Colorado: Adams, Arapahoe, Boulder, Douglas, Elbert, El Paso, Jackson, Jefferson, Larimer, Weld.

District 17. Southern Colorado

The following counties in Colorado: All counties not included in northern Colorado district.

The following counties in New Mexico: All coal-producing counties in the State of New Mexico, except those included in the New Mexico district.

District 18. New Mexico

The following counties in New Mexico: Grant, Lincoln, McKinley, Rio Arriba, Sandoval, San Juan, San Miguel, Santa Fe, Socorro.

The following counties in Arizona: Pinal, Navajo, Graham, Apache, Coconino.

All coal-producing counties in California.

District 19. Wyoming

All coal-producing counties in Wyoming.

The following counties in Idaho: Fremont, Jefferson, Madison, Teton, Bonneville, Bingham, Bannock, Power, Caribou, Oneida, Franklin, Bear Lake.

District 20. Utah

All coal-producing counties in Utah.

District 21. North Dakota-South Dakota

All coal-producing counties in North Dakota. All coal-producing counties in South Dakota.

District 22. Montana

All coal-producing counties in Montana.

District 23. Washington

All coal-producing counties in Washington. All coal-producing counties in Oregon.

The Territory of Alaska.

Interior-Bureau of Mines, Pittsburgh, Pa.